THE SMARTER WAY TO REDUCE EMISSIONS

REMEHA CONDENSING BOILER RANGE

The most efficient way to reduce your carbon footprint.

GAS 310/610 ECO PRO

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INTRODUCTION

60% of the buildings that will be standing in 2050 are already here with us today. So tomorrow, there will be a great need for intelligent heating technology specifically designed for refurbished buildings. This is where Remeha's advanced thinking is leading the way. To a future where our highly efficient heating systems help to improve the overall energy efficiency of refurbished buildings. Giving them new life and a more sustainable future.

The Remeha Gas 310 ECO PRO and the Remeha Gas 610 ECO PRO are compact, floor standing condensing boilers. Their small footprint and ability to be installed side to side makes them ideally suited for modular configuration. An optional Optimising Weather Compensating control package is available to ensure maximum efficiency. The boilers are suitable for both new and retrofit applications. With conventional and room sealed capability, they can be installed in most situations.

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BOILER DESCRIPTION

The Remeha Gas 310/610 ECO PRO boilers are fully assembled, free standing, gas fired (Natural gas only), fully modulating, high efficiency condensing boilers and are supplied on wheels for easy manoeuvrability into the boiler house.

The sectional cast aluminium heat exchanger and other major components are contained within a rigid steel frame with removable casing parts for maintenance purposes. The Remeha Gas 310 ECO PRO and each Remeha Gas 610 ECO PRO module frame is fitted with a set of wheels to enable the assembled unit to be easily manoeuvred into position within the plant room on site with the minimum of effort. All major electrical and electronic controls are contained within the instrument panel mounted on top of the boiler at the opposite end to the connections facing to the front (long side) but can be rotated 90° towards the short side to suit site location. The Remeha Gas 310 ECO PRO boiler is available with flow and return connections on the left or right hand end of the boiler (this must be decided at time of order), with the gas connection on the top of the boiler. The flue gas outlet, complete with a condensate connection, is at low level on the same end as the F/R connections. The combustion air inlet is located at the top of the boiler. The Remeha Gas 610 ECO PRO boiler has two flows and returns at one end of the boiler with a combined flue gas outlet. The boiler is not available with a choice between left or right hand versions, but the control panel can easily be rotated to enable the boiler connections to be on the left or right hand side.

The boilers are suitable for room sealed or conventional flue applications and have been designed for central heating and indirect hot water production at working pressures not exceeding 7 bar. They must be installed on a fully pumped system and are designed for operating pressures between 0.8 and 7 bar.

The pre-mix gas burner (NG only) with its gas/air ratio control system ensures clean, trouble-free operation with higher than average annual efficiencies of up to 109.35% Hi (NCV) in the condensing mode combined with ultra low NOx and minimum CO_2 emissions. The standard control package allows for external On/Off, High Low (volt free switch/s) or Modulating control (0-10V input). The built-in digital display shows normal operating/fault code indication and allows actual and set values to be read and adjusted.

The intelligent, advanced boiler control ('abc®') continuously monitors the boiler operating conditions, varying the heat output to suit the system load. The control is able to react to external "negative" influences in the rest of the system (flow rates, air/gas supply problems) maintaining boiler output for as long as possible without resorting to a lockout condition. At worst, the boiler will reduce its output and/or shut down (shut off mode) awaiting the "negative" conditions to return to normal before restarting. The 'abc®' control cannot override the standard flame safety controls.

All Remeha Gas 310/610 ECO PRO boilers are tested after assembly to ensure the boiler and controls comply to our strict quality policy.

APPLICATION INFORMATION

The Remeha Gas 310/610 ECO PRO boilers can be used on all new and refurbishment projects in both single and multiple configurations. Conventional and room sealed flue system capability means that the boiler can be sited almost anywhere within a building.

The Remeha iSense and "OpenTherm" weather compensators (option) are able to communicate directly with the boilers' controls to make full use of their fully modulating features, ensuring that the boiler closely matches the system demand at all times.

External control systems (BMS) can be interfaced with the boiler to provide on/off - or modulating (0-10V) control options.

A key benefit of the Remeha Gas 310/610 Eco Pro is that it is Renewable Energy Ready. Most renewable energy products need to be backed up by a condensing boiler during periods of peak demand.

The secondary return feature on the new Remeha Gas 310/610 Eco Pro makes this boiler particularly suitable for use with renewable energy technologies that use low grade heat such as heat pumps or underfloor heating circuits.

Bivalent systems such as this combine the best of renewable and conventional heating technologies to maximise the seasonal efficiency of the system as a whole over the course of the year.

ADVANTAGES AT A GLANCE

- Inspected for compliance
- Lightweight construction
- Easy disassembly
- Supplied with wheels for quick and easy installation
- High efficiency - 106.8% at 50°C/30°C (NCV)
- Boiler controls - on/off high/low or fully modulating over 20%-100% (1:5)
- Low NOx ≥ 35
- Ultra quiet > 65 dBA
- Digital Diagnostic Display
- Cast - sectional aluminium heat exchanger
- Cylindrical, stainless steel, premix burner
- Control adjustable 20°C-90°C
- Air pressure differential sensor (LDS)
- Temperature sensors for low water level protection
- Gas/air mixing system with venturi
- Electronic control and protection equipment
- Frost protection
- Conventional or room sealed capability
- Menu controlled microprocessor boiler control
- Enhanced failure functionality
- Compact at only 72cm wide - fit through a standard door
- Left or right hand version Gas 310 ECO PRO

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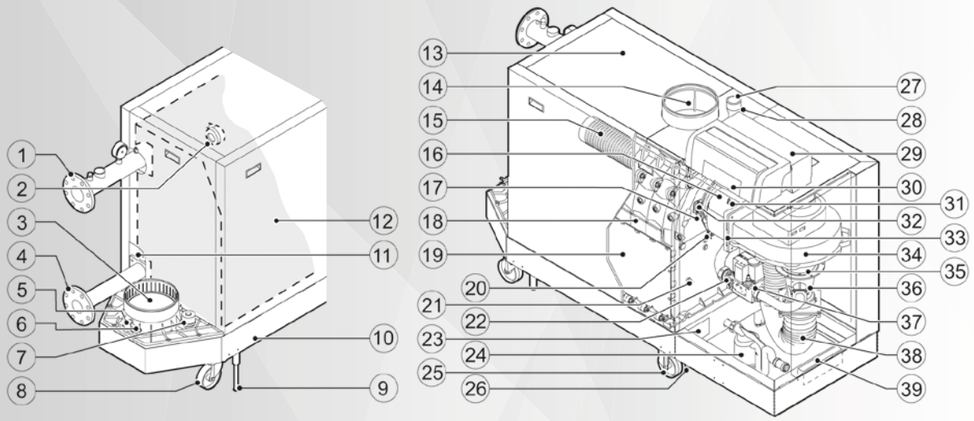
TYPICAL REMEHA GAS 310 ECO PRO BOILER CONSTRUCTION

The unit has been inspected for compliance with the essential requirements of the following directives:
CE identification number (PIN): 0063CL3613
NOx Class: 5



1 Flow connection
2 Air differential pressure switch
3 Flue gas discharge pipe
4 Return connection
5 Outlet for measuring combustion gases
6 Flue gas thermostat (option)
7 Condensate collector sealant cap
8 Pivoting castor
9 Jacking bolt
10 Base frame
11 Connection for second return (optional)
12 Heat exchanger insulation kit (option)
13 Boiler casing
14 Air inlet 34 Fan
15 Burner
16 Adapter
17 Ignition/ionization electrode
18 Heat exchanger
19 Inspection hatch
20 Heat exchanger sensor
21 Return sensor
22 Gas filter
23 Data plate
24 Siphon
25 Fixed castor
26 Jacking bolt
27 Gas connection
28 Gas pressure measurement point
29 Control panel
30 Location for optional features or a control unit
31 Pressure measurement point
32 Sight glass
33 Non-return valve
35 Extension piece
36 Venturi
37 Gas block
38 Air inlet hose
39 Document holder

EFFICIENCY INFORMATION

Average Annual Efficiency DIN 4702 Part 8

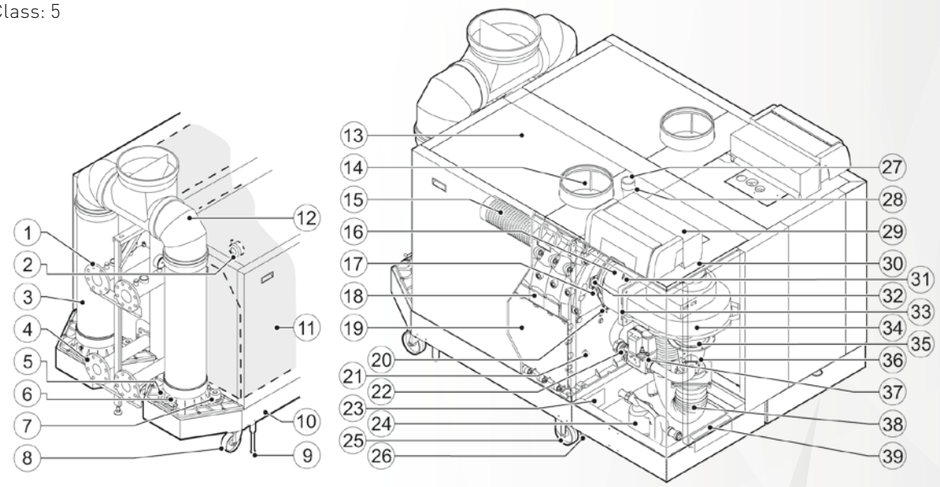
Up to 109.35% at Hi
a. Up to 98.4% at Hi at an average water temperature of 70°C (80°C/60°C)
b. Up to 106.8% at Hi at an average water temperature of 40°C (50°C/30°C)

Maintenance Consumption

Average 0.15 at 30K
ΔT = Boiler temp - Ambient temperature
NOTE: NCV = Hi, GCV = Hs

TYPICAL REMEHA GAS 610 ECO PRO BOILER CONSTRUCTION

The unit has been inspected for compliance with the essential requirements of the following directives:
CE identification number (PIN): 0063CL3613
NOx Class: 5



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OPERATING PRINCIPLE

Combustion air is drawn into the inlet connection from the plant room (conventionally flued) or from outside via the eccentric flue system (room sealed) by an air supply fan.

On the inlet side of the fan is a specially designed chamber (venturi unit) which takes gas from the multiblock and mixes it in the correct proportions with the incoming air. This mixing system ensures that the correct gas/air ratio is delivered to the pre-mix burner at all times.

Depending on demand (under the dictates of flow/return sensor and other external/internal control inputs) the 'abc®' system determines the required boiler output. The 'abc®' control then varies the speed of the air supply fan which alters the volume of air being drawn into the venturi. This change in volume is measured using air pressure differential which directly controls the volume of gas also being delivered to the venturi. The resultant controlled mixture is delivered to the premix burner.

This mixture is initially ignited by the combined ignition/ionisation probe, which monitors the state of the flame. Should the flame be unstable or not ignite within the pre-set safety time cycle, the controls will (after 5 attempts) shut the boiler down requiring manual intervention to reset the boiler. The digital display will indicate a flashing fault code confirming the reason for the failure.

The products of combustion in the form of hot flue gases are forced through the heat exchanger transferring their heat to the system water (the flue gas temperature is reduced to approximately 5°C/8°C above the temperature of the system return water) then discharged via the condensate collector, to the flue gas outlet connection, to the atmosphere.

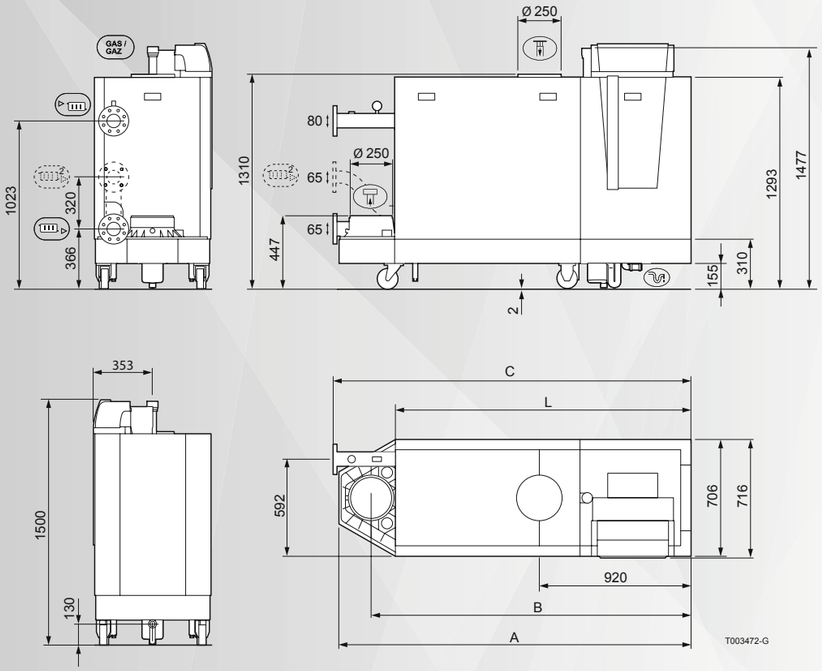
There will be a vapour cloud formed at the flue gas terminal, because of the low flue gas exit temperature - this is not smoke, simply water vapour formed during the combustion process.

When the flue gas temperature falls below dew point (55°C), water vapour (created during the combustion process) will begin to condense out in the boiler, transferring its latent heat into the system water, thereby increasing the output of the boiler without increasing the gas consumption.

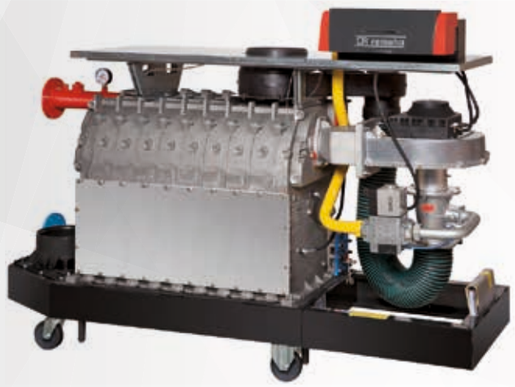
Condensation formed within the boiler and flue system is discharged from the boiler to an external drain via the drain pan and siphon supplied.

The boiler can be supplied as an option with a second (constant temperature) return connection. This additional connection enables the boiler to make full use of its condensing ability whilst accepting both fixed and variable temperature returns from the same system.

REMEHA GAS 310 ECO PRO DIMENSIONS



- Heating circuit flow (80mm) " ;" Flange NW 80 (Standard DIN 2576)
- Heating circuit return (65mm) " ;" Flange NW 80 (Standard DIN 2576)
- Gas connection" ;" G2" (Female thread)
- Condensates discharge" ;" 1¼" (Internal)
- Flue gas outlet" ;" Ø 250mm
- Air intake" ;" Ø 250mm
- Second return (optional)" ;" Flange NW 80 (Standard DIN 2576)

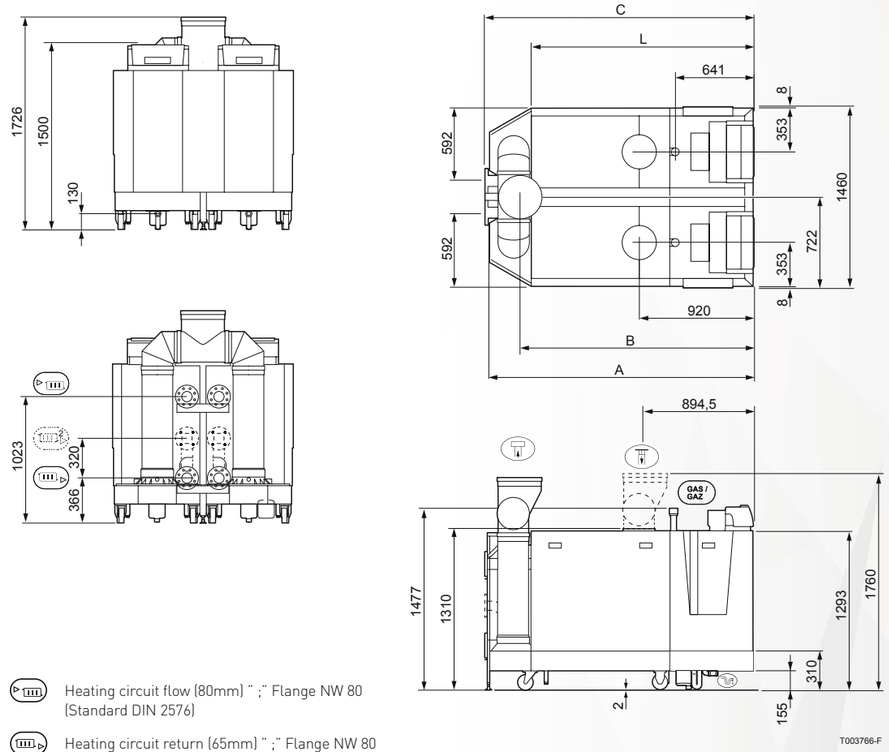


Remeha Gas 310 ECO PRO				
Boiler type	**A** (mm)	**B** (mm)	**C** (mm)	**D** (mm)
310-285 (5)	1833	1635	1862	1490
310-355 (6)	1833	1635	1862	1490
310-430 (7)	1833	1635	1862	1490
310-500 (8)	2142	1944	2172	1800
310-575 (9)	2142	1944	2172	1800
310-650 (10)	2142	1944	2172	1800

NOTE: Heating flow pipe 80mm with a mating flange NW 80 (PN16) Return flow pipe 65mm with a mating flange NW 80 (PN16) The optional return pipe is also 65mm and fitted with a NW80 (PN16) mating flange

The service areas are shown on page 12/13.

REMEHA GAS 610 ECO PRO DIMENSIONS



- Heating circuit flow (80mm) " ;" Flange NW 80 (Standard DIN 2576)
- Heating circuit return (65mm) " ;" Flange NW 80 (Standard DIN 2576)
- Gas connection" ;" G2" (Female thread)
- Condensates discharge" ;" 1¼" (Internal)
- Flue gas outlet" ;" Ø 350mm
- Air intake" ;" Ø 250mm
  Air supply collector (Optional)" ;" Ø 350mm
- Second return (optional)" ;" Flange NW 80 (Standard DIN 2576)

Remeha Gas 610 ECO PRO				
Boiler type	**A** (mm)	**B** (mm)	**C** (mm)	**D** (mm)
610-570 (5)	1833	1635	1862	1490
610-710 (6)	1833	1635	1862	1490
610-860 (7)	1833	1635	1862	1490
610-1000 (8)	2142	1944	2172	1800
610-1150 (9)	2142	1944	2172	1800
610-1300 (10)	2142	1944	2172	1800

NOTE: Heating flow pipe 80mm with a mating flange NW 80 (PN16) Return flow pipe 65mm with a mating flange NW 80 (PN16) The optional return pipe is also 65mm and fitted with a NW80 (PN16) mating flange

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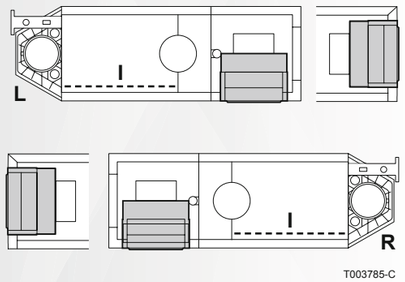
REMEHA GAS 310 ECO PRO DIMENSIONS

The service side with the inspection hatch on the heat exchanger is considered to be the front of the boiler. The Remeha Gas 310 ECO PRO boiler is available in both a left-hand and right-hand version. This means that the hydraulic connections and the flue gas discharge are situated on either the left or the right-hand side of the boiler. The control panel is on the front as standard, but can easily be rotated so that it is on the short side.

To make the boiler level and to raise the wheels off the floor, the adjustment bolts must be used. Turn the adjustment bolts out as soon as the boiler is placed in the correct position. The picture shows the support surface of the boiler. This is the position of the adjustment bolts.

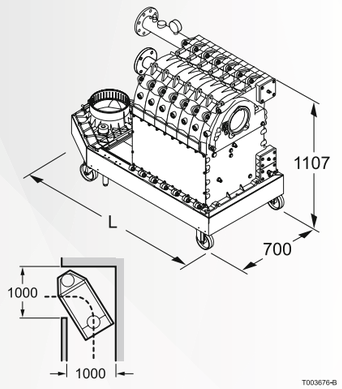


T003785-C

L Left version
R Right version
I Inspection hatch

Remeha Gas 310 ECO PRO	
Boiler type	**A** (mm)
310-285	723
310-355	723
310-430	723
310-500	1032
310-575	1032
310-650	1032

Remeha Gas 610 ECO PRO	
Boiler type	**L** (mm)
610-570	1160
610-710	1160
610-860	1160
610-1000	1469
610-1150	1469
610-1300	1469



T003676-B

CAUTION

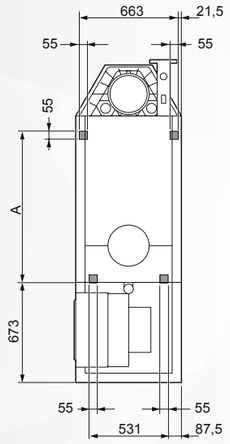
The wheels are designed for transport purposes only and not for use when the boiler is in its final position.

If required for internal transport, the boiler can be dismantled into smaller parts for transport. The boiler can be stripped of :

- Casing components
- Gas/air components
- The frame section on the instrument panel side

See the diagram and table for the dimensions of the largest remaining transport part, the frame section with heat exchanger and water connections.

For information on fitting the parts, refer to the assembly instructions delivered with the boiler.



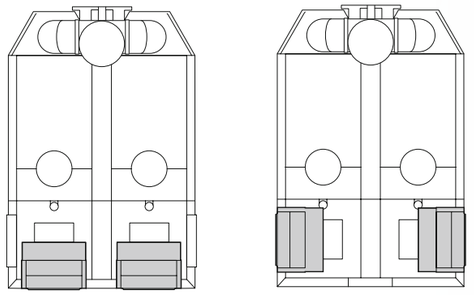
T003474-B

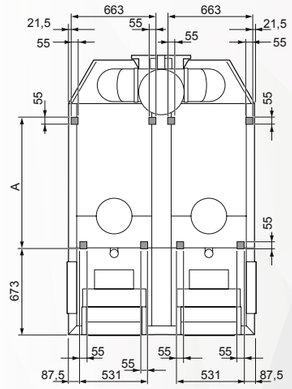
Diagram shows position of support feet

REMEHA GAS 610 ECO PRO DIMENSIONS

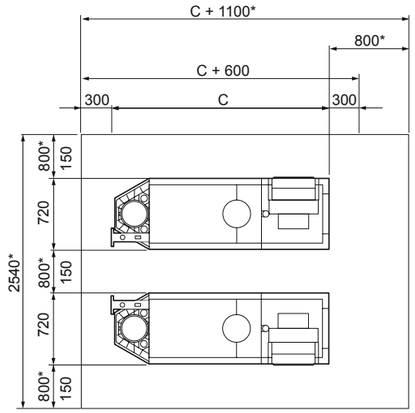
The Remeha Gas 610 ECO PRO boiler is not available with a choice between left or right hand versions, but the control panel can easily be rotated to enable the boiler connections to be on the left or right hand side.

To make the boiler level and to raise the wheels off the floor, the adjustment bolts must be used. Turn the adjustment bolts out as soon as the boiler is placed in the correct position. The picture shows the support surface of the boiler. This is the position of the adjustment bolts.

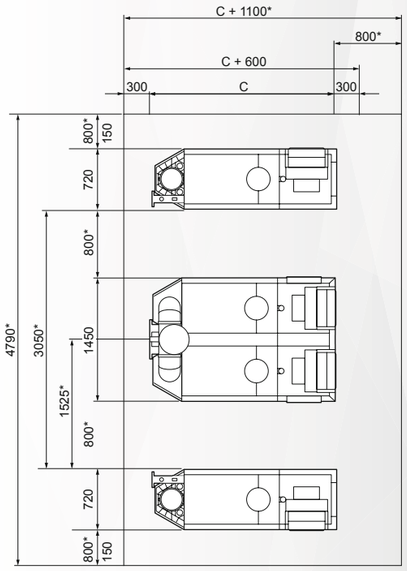




SPACE SAVING CONFIGURATIONS



* Indicates spacing required if this is the operating side



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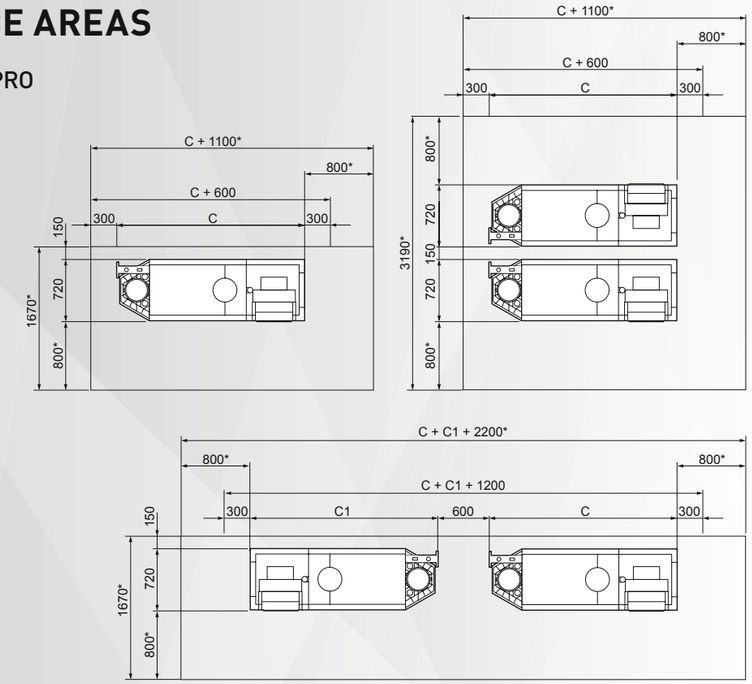
MAINTENANCE AREAS

Remeha Gas 310 ECO PRO

For the dimensions of C/C1, see page 8

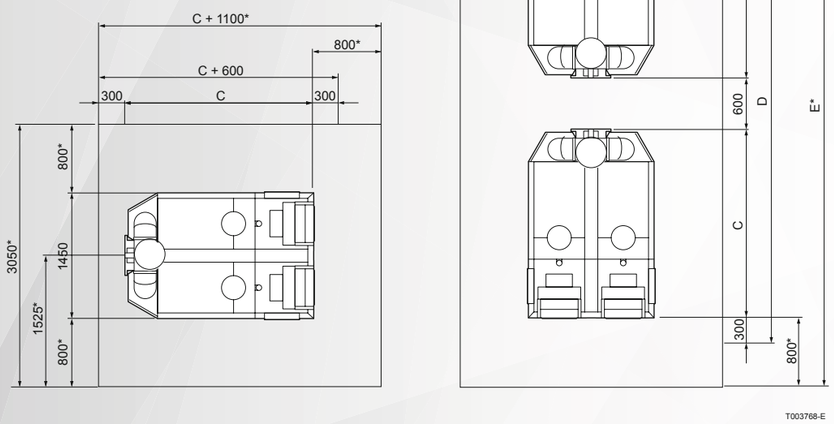


* Spacing required if this is operating side.

Remeha Gas 610 ECO PRO

For the dimensions of C/C1, see page 9

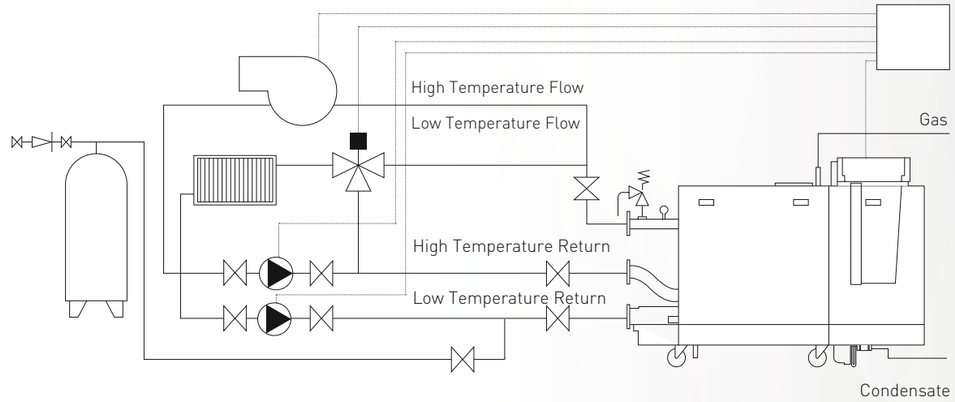
A technical clearance of at least 80 cm is required at the front (service side) of the boiler. However, we recommend that the clearance is at least 100 cm. We recommend a clearance of at least 40 cm above the boiler. If the air supply filter is used, there must be a clearance of at least 65 cm. A minimum of 30 cm is required on the side of the flue gas discharge, and a minimum of 30 cm is also required on the other side, or 80 cm, if this is the operating side.



* Spacing required if this is operating side.

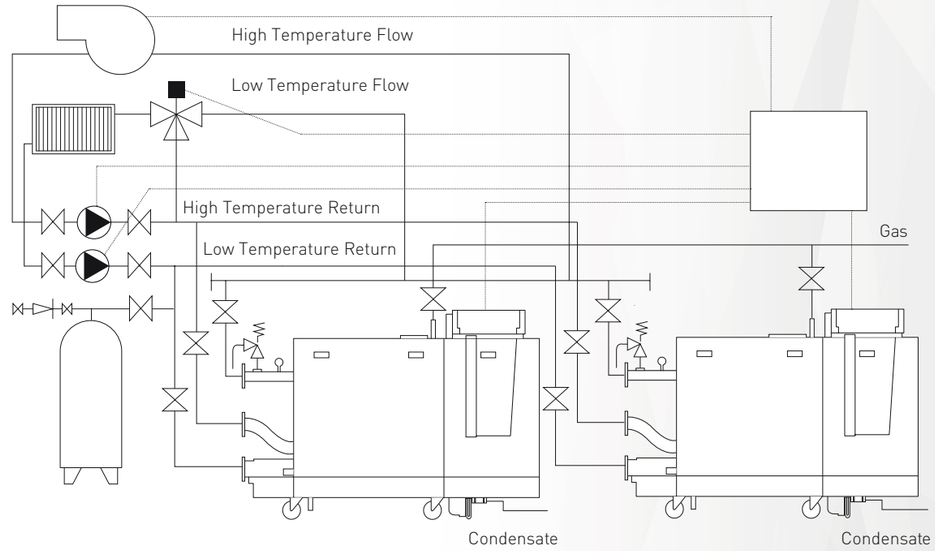
SINGLE GAS 310 ECO PRO

Using the optional secondary return



MULTIPLE BOILER GAS 310 ECO PRO

Using the optional secondary return



Typical diagrams shown do not constitute a full system design and should be used for general concept information only. All equipment should be installed to manufacturers instructions and must comply with current regulations in force.

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REMEHA GAS 310 ECO PRO TECHNICAL DATA

Remeha Gas 310 ECO PRO			285	355	430	500	575	650
General								
Number of sections	-	-	5	6	7	8	9	10
EC indentification no.	PIN		0063CL3613					
Flow rate setting	Adjustable		Modulating, Start/Stop, 0-10V					
Norminal output (Pn) Heating System (80/60°C)	minimum maximum[1]	kW	51 261	65 327	79 395	92 46	106 530	119 601
Norminal output (Pn) Heating System (50/30°C)	maximum [1]	kW	279	350	425	497	574	651
Norminal input (Qn) (Hs)	minimum maximum[1]	kW	60 295	75 369	96 445	105 520	121 598	135 677
Norminal input (Qn) (Hi)	minimum maximum[1]	kW	54 266	68 333	82 402	95 469	109 539	122 610
Full load water efficiency (Hi) (80/60°C)%		%	98.0	98.1	98.2	98.3	98.4	98.5
Full load water efficiency (Hi) (50/30°C)%		%	104.8	105.2	105.6	106.0	106.4	106.8
Low load water efficiency (Hi) (Return temp 60°C)		%	94.7	95.3	95.8	96.3	96.8	97.3
Annual efficiency G20 (Emission 0^2 = 0%) (DIN 4702, Part 8)		%	109.6	109.5	109.4	109.3	109.2	109.1
Data on the gases and combustion gases								
Gas consumption G20 (Gas H)	minimum maximum	m_s ^{3}/h	5.7 28.1	7.2 35.2	8.7 42.5	10.1 49.6	11.5 57.0	12.9 64.6
Gas inlet pressure G20 (Gas H)	minimum maximum	mbar	17 30	17 30	17 100	17 100	17 100	17 30
Flue gas losses		%	2.3	2.3	2.3	2.3	2.3	2.3
NOx-Emission per year (BREEAM)	(EN 15420)	mg/kWh	33	35	32	29	36	26
Maintenance consumption (Ps)	(ΔT = 30K)[2]	W %	571 0.21	591 0.18	611 0.15	630 0.13	650 0.12	670 0.11
Mass flue gas flow rate	minimum maximum	kg/h	91 448	114 560	138 676	160 789	183 907	205 1026
Flue gas temperature	minimum maximum	°C	30 80					
Maximum counter pressure		Pa	130	120	130	150	150	150
Characteristics of the heating circuit								
Water content		l	49	60	71	82	93	104
Water operating pressure	minimum	bar	0.8					
Water operating pressure (PMS)	maximum	bar	7					
Water temperature	maximum	°C	110					
Operating temperature	minimum maximum	°C	20 90					
	Factory setting	°C	80					
Water resistance (ΔT = 20K)		mbar kPa	113 11.3	110 11	120 21	110 1	125 12.5	130 13.0
Water resistance (ΔT = 10K)		mbar kPa	374 37.4	364 36.4	397 39.7	364 36.4	413 41.3	435 43.5
Electrical characteristics								
Power supply voltage		VAC/Hz	230/50					
Fuse (230 VAC)	F2 Circuit-breaker F1 control PCB	AT AT	10 2					
Power consumption - Full load	maximum	W	279	334	426	543	763	723
Power consumption - Part load	maximum	W	46	46	58	61	62	55
Power consumption - Standby	maximum	W	6	6	6	6	6	6
Electrical protection index		IP	X1B[3]					
Other characteristics								
Weight (empty)	Total	kg	364	398	433	495	531	568
Acoustic level at 1 metre		dB(A)	61	61	65	65	65	65
Ambient temperature	maximum	°C	40					

(1) Factory setting (2) ΔT = Boiler temp - Ambient temperature (3) For a room sealed operation

REMEHA GAS 610 ECO PRO TECHNICAL DATA

Remeha Gas 610 ECO PRO			570	710	860	1000	1150	1300
General								
Number of sections	-	-	2x5	2x6	2x7	2x8	2x9	2x10
EC indentification no.	PIN		0063CL3613					
Flow rate setting	Adjustable		Modulating, Start/Stop, 0-10V					
Norminal output (Pn) Heating System (80/60°C)	minimum maximum[1]	kW	69 522	87 654	123 790	122 922	148 1060	158 1202
Norminal output (Pn) Heating System (50/30°C)	minimum maximum[1]	kW	558	700	850	994	1148	1303
Norminal input (Qn) (Hs)	minimum maximum[1]	kW	80 590	101 738	142 890	141 1038	170 1196	180 1354
Norminal input (Qn) (Hi)	minimum maximum[1]	kW	72 532	91 666	128 804	127 938	170 1078	162 1220
Full load water efficiency (Hi) (80/60°C)%		%	98.0	98.1	98.2	98.3	98.4	98.5
Full load water efficiency (Hi) (50/30°C)%		-	104.8	105.2	105.6	106.0	106.4	106.8
Low load water efficiency (Hi) (Return temp 60°C)		%	94.7	95.3	95.8	96.3	96.8	97.3
Annual efficiency G20 (Emission 0^2 = 0%) (DIN 4702, Part 8)		%	109.6	109.5	109.4	109.3	109.2	109.1
Data on the gases and combustion gases								
Gas consumption G20 (Gas H)	minimum maximum	m_s ^{3}/h	7.6 56.2	9.6 70.4	13.5 85.0	13.4 99.2	16.2 114.0	17.2 129.2
Gas inlet pressure G20 (Gas H)	minimum maximum	mbar	17 30	17 30	17 100	17 100	17 100	17 30
Flue gas losses		%	2.3	2.3	2.3	2.3	2.3	2.3
NOx-Emission per year (BREEAM)	(EN 15420)	mg/kWh	33	35	32	29	36	26
Maintenance consumption (Ps)	(ΔT = 30K)[2]	W %	1142 0.21	1182 0.18	1222 0.15	1260 0.13	1300 0.12	1340 0.11
Mass flue gas flow rate	minimum maximum	kg/h	182 896	228 1120	276 1352	320 1578	366 1814	410 2052
Flue gas temperature	minimum maximum	°C	30 80					
Maximum counter pressure		Pa	130	120	130	130	130	150
Characteristics of the heating circuit								
Water content		l	98	120	142	164	186	208
Water operating pressure	minimum	bar	0.8					
Water operating pressure (PMS)	maximum	bar	7					
Water temperature	maximum	°C	110					
Operating temperature	minimum maximum	°C	20 90					
	Factory setting	°C	80					
Water resistance (ΔT = 20K)		mbar kPa	113 11.31	110 11	120 21	110 11	125 12.5	130 13.0
Water resistance (ΔT = 10K)		mbar kPa	374 37.4	364 36.4	397 39.7	364 36.4	413 41.3	435 43.5
Electrical characteristics								
Power supply voltage		VAC/Hz	230/50					
Fuse (230 VAC)	F2 Circuit-breaker F1 control PCB	AT AT	10 2					
Power consumption - Full load	maximum	W	558	668	852	1086	1526	1446
Power consumption - Part load	maximum	W	929	82	116	122	124	110
Power consumption - Standby	maximum	W	12	12	12	12	12	12
Electrical protection index		IP	X1B[3]					
Other characteristics								
Weight (empty)	Total	kg	707	771	837	957	1025	1095
Acoustic level at 1 metre		dB(A)	64	64	68	68	68	68
Ambient temperature	maximum	°C	40					

(1) Factory setting (2) ΔT = Boiler temp - Ambient temperature (3) For a room sealed operation

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REMEHA GAS 310 ECO PRO FLUE DATA

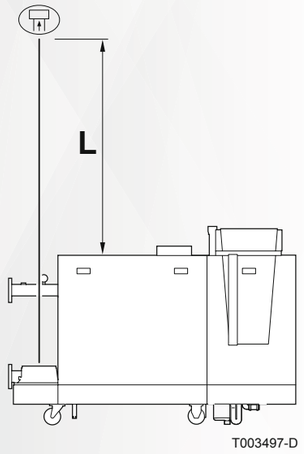
Open flue (B23, B23P)

If using an open version, the air supply opening remains open; only the combustion gas opening is connected. The boiler then takes in the combustion air required directly from the premises in which it is installed. For the application of air discharge and combustion gas discharge piping with a diameter other than 250 mm, a reducer should be used.

If the boiler, in room ventilated operation, has been set up in a (very) dusty room, use the air supply filter (= accessory).

CAUTION

The air supply opening must remain open. The premises in which the appliance is installed must be fitted with the necessary air supply openings. They must not be reduced or closed.



Chimney length for the open version - Gas 310 ECO PRO

Boiler type	Maximum length (L)[1]			
	with a Ø of 150mm	with a Ø of 180mm	with a Ø of 200mm	with a Ø of 250mm
310-285 (5)	20m	50m	50m	50m
310-355 (6)	11m	30m	50m	50m
310-430 (7)	8m	22m	39m	50m
310-500 (8)	7m	18m	32m	50m
310-575 (9)	5m	13m	24m	50m
310-650 (10)	5m	12m	21m	50m

Pipe reductions per element used

Diameter	Elbow 45°	Elbow 90°
150mm	1.2m	2.1m
180mm	1.4m	2.5m
200mm	1.6m	2.8m
250mm	2.4m	3.5m
300mm	2.4m	4.2m

[1] Calculated with rigid pipe and outlet without hood (open˙free˙)

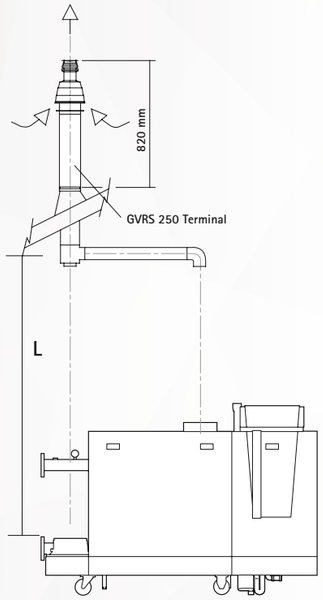
Room sealed flue (C33, C63, C93)

If using a room sealed version, it is necessary to connect both the combustion gas exhaust and the air supply opening (parallel). For the application of air discharge and combustion gas discharge piping with a diameter other than 250 mm, a reducer should be used.

Chimney length for the room sealed version - Gas 310 ECO PRO

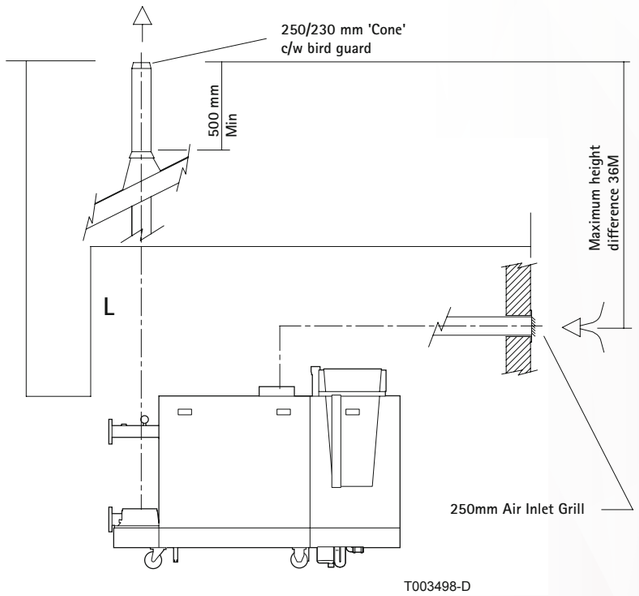
Boiler type	Maximum length (L)[1]		
	with a Ø of 200mm	with a Ø of 250mm	with a Ø of 300mm
310-285 (5)	42m	50m	50m
310-355 (6)	21m	50m	50m
310-430 (7)	13m	50m	50m
310-500 (8)	10m	50m	50m
310-575 (9)	5m	34m	50m
310-650 (10)	4m	30m	50m

[1] Calculated with rigid pipe and outlet without hood (open˙free˙)



Connection in areas of different pressure (C53, C83)

Combustion air supply and combustion gas discharge are possible in various pressure zones, semi-CLV systems. With the exception of coastal areas. The maximum permissible difference in height between the combustion air supply and the combustion gas discharge is 36 m.



Chimney length in various pressure zones - Gas 310 ECO PRO

Boiler type	Maximum length (L)[1]
	with a Ø of 250mm
310-285 (5)	50m
310-355 (6)	50m
310-430 (7)	50m
310-500 (8)	50m
310-575 (9)	49m
310-650 (10)	40m

[1] Calculated with rigid pipe and outlet without hood (open˙free˙)

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REMEHA GAS 610 ECO PRO FLUE DATA

Open flue (B23, B23P)

If using an open version, the air supply opening remains open; only the combustion gas opening is connected. The boiler then takes in the combustion air required directly from the premises in which it is installed. For the application of air discharge and combustion gas discharge piping with a diameter other than 250 mm, a reducer should be used.

If the boiler, in room ventilated operation, has been set up in a (very) dusty room, use the air supply filter (= accessory).

Chimney length for the open version - Gas 610 ECO PRO

Boiler type	Maximum length (L)[1]		
	with a Ø of 250mm	with a Ø of 300mm	with a Ø of 350mm
610-570 (5)	50m	50m	50m
610-710 (6)	31m	50m	50m
610-860 (7)	20m	50m	50m
610-1000 (8)	11m	39m	50m
610-1150 (9)	5m	26m	50m
610-1300 (10)	3m	19m	50m

[1] Calculated with rigid pipe and outlet without hood (open'free')

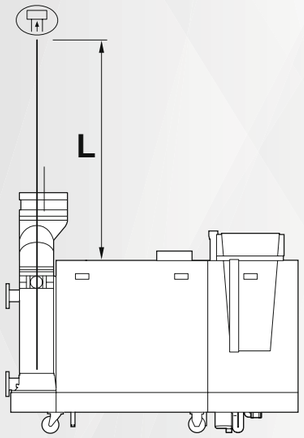
Room sealed flue (C33, C63, C93)

If using a room sealed version, it is necessary to connect both the combustion gas exhaust and the air supply opening (parallel). For the application of air discharge and combustion gas discharge piping with a diameter other than 250 mm, a reducer should be used.

Chimney length for the room sealed version - Gas 610 ECO PRO

Boiler type	Maximum length (L)[1]		
	with a Ø of 300mm	with a Ø of 350mm	with a Ø of 400mm
610-570 (5)	50m	50m	50m
610-710 (6)	43m	50m	50m
610-860 (7)	26m	50m	50m
610-1000 (8)	13m	35m	50m
610-1150 (9)	5m	16m	24m
610-1300 (10)	-	10m	12m

[1] Calculated with rigid pipe and outlet without hood (open'free')



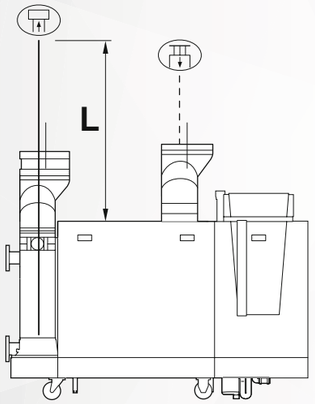
T003667-F

CAUTION

The air supply opening must remain open. The premises in which the appliance is installed must be fitted with the necessary air supply openings. They must not be reduced or closed.

Pipe reductions per element used

Diameter	Elbow 45°	Elbow 90°
150mm	1.2m	2.1m
180mm	1.4m	2.5m
200mm	1.6m	2.8m
250mm	2.0m	3.5m
300mm	2.4m	4.2m
350mm	2.8m	4.9m
400mm	3.2m	5.6m



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Connection in areas of different pressure (C53, C83)

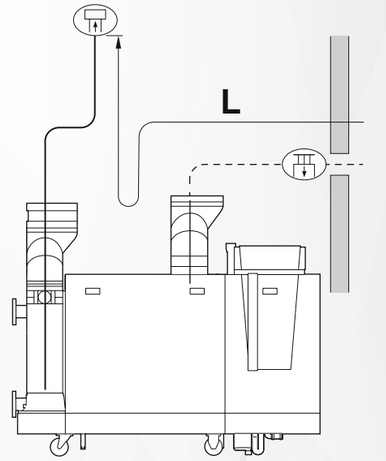
Combustion air supply and combustion gas discharge are possible in various pressure zones, semi-CLV systems. With the exception of coastal areas. The maximum permissible difference in height between the combustion air supply and the combustion gas discharge is 36 m.

Chimney length in various pressure zones - Gas 610 ECO PRO

Boiler type	Maximum length (L)[1]
	with a Ø of 350mm
610-570 (5)	50m
610-710 (6)	50m
610-860 (7)	50m
610-1000 (8)	33m
610-1150 (9)	-
610-1300 (10)	-

[1] Calculated with rigid pipe and outlet without hood (open'free')

Greater five lengths can be achieved.
Please contact the Remeha Commercial Technical Department.



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ADDITIONAL DIRECTIVES

Connection of the combustion gas exhaust directly to the building's brick chimneys or flues is forbidden for condensation reasons.

If flues or chimneys are to be used, they must have an airtight construction with thick walls and be made from rigid aluminium or stainless steel. Flexible supply flue pipes made from plastic or stainless steel are also permissible. Aluminium is permissible only if there is no contact between the building supply section and the combustion gas exhaust pipe.

Always clean the ducts thoroughly in cases where lining pipes are used and/or a connection of the air supply.

It must be possible to inspect the flue or chimney.

For long, aluminium, combustion-gas exhaust pipes it is initially necessary to consider the relatively high quantity of corrosive products which are brought together with the condensate from the exhaust pipe. The siphon on the equipment requires regular cleaning or, preferably, an additional condensate collector can be installed above the equipment.

The combusted gas discharge pipe must be sufficiently inclined towards the boiler (at least 50 mm per metre) and an adequate condensate collection tank and discharge system constructed (at least 1 m before the boiler opening). The elbows fitted must be at more than 90° to guarantee the provision of an adequate gradient and tightness on the lip rings.

Please contact us for further information.

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CONTROLS

The Remeha Gas 310/610 ECO PRO boilers can be controlled using one of the following methods:

NOTE: This applies to each module on the Remeha Gas 610 ECO PRO.

1. On/Off control

GAS 310 ECO PRO
(1 x NO VOLT FREE SWITCHED PAIR)

The heat output modulated between the minimum and the maximum value based on the set flow temperature, connected to ON/OFF - OT on PCU-06. Please see page 24.

GAS 610 ECO PRO (2 SETS)
(2 x NO VOLT FREE SWITCHED PAIR)

The heat output modulates between the minimum and the maximum value based on the set flow temperature, connected to ON/OFF - OT on PCU-06

2. Modulating

- Fully modulating, where the output modulates between the minimum and maximum value on the basis of the flow temperature defined by the modulating controller.

NOTE: when using on/off control the boiler will also modulate to maintain the flow temp set point.

- Analogue control (0-10 volts), where the heat output or temperature is controlled by a 0-10 volt signal.
- On/Off control, (one volt free relay) where the heat output modulates between the minimum and maximum value on the basis of the flow temperature set in the boiler.

In all cases, modulation is based on the required flow temperature and there is a Δt dependent output control with the following characteristic. Up to a Δt of 25°C (factory setting, parameter H) the boiler operates at full capacity. Between Δt full load and Δt part load the output reduces in linear fashion.

- Modulating controls general (two wire control)

  To make full use of the boiler's modulating feature, iSense controls can be connected. These controls will provide optimised time and weather compensation to achieve maximum efficiency and minimum boiler cycling whilst maintaining design condition within the building.

- Single and multiple optimising/weather-compensating boiler controls are available for one or multiple boilers (up to a max of 8 x Remeha Gas 310 ECO PRO or 4 x Remeha Gas 610 ECO PRO).

These compensators can regulate the boiler output against outside weather conditions and provide time and temperature control over the DHW.

The compensator is mounted in one of the boilers and is interfaced to communicate with the boiler's controls via the supplied adapter. Onsite connection of the supplied outside and common flow sensors complete the installation.

NOTE: Please refer to the relevant control leaflet for optimising/compensation settings.

3. Analogue input (0-10)

The function of the analogue input can be set using parameter P37

This control can be based on temperature or heat output. If this input is used for 0-10 V control, then the boiler OT communication is ignored.

Analogue temperature-based control (°C)

The 0-10 V signal controls the boiler flow temperature. This control modulates on the basis of flow temperature, whereby the heat output varies between the minimum and maximum values on the basis of the flow temperature set point calculated by the controller.

Input signal (V)	Temp °C	Description
0 - 1.5	0 - 15	Boiler off
1.5 - 1.8	15 - 18	Hysteresis
1.8 - 10	18 - 100	Temperature required

Analogue heat output-based control (%)

The 0-10 V signal controls the boiler output. The minimum and maximum values are limited. The minimum output is linked to the boiler's modulation depth. The output varies between the minimum and maximum value on the basis of the value determined by the controller.

Input signal (V)	Heat Output °C	Description
0 - 2.0[1]	0 - 20	Boiler off
2.0 - 2.2[1]	20 - 22	Hysteresis
2.0 - 10[1]	20 - 100	Heat output supplied

[1] Dependent on the minimum modulation depth (set speeds, standard 20%)

4. Analogue output (0-10)

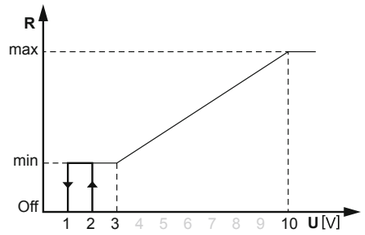
The function of the analogue output can be set using parameter P36

An outgoing 0-10 V signal can be used either to report the supplied heat output or the supplied temperature.

The speed of the system pump can be controlled with an outgoing 0-10 V signal.

(Only possible if the pump is suitable for this).

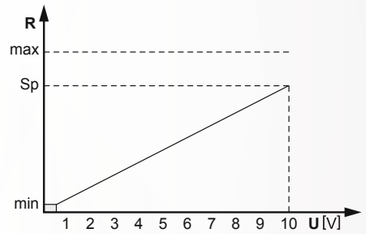
Control of 0-10 V Wilo system pump



R Pump regime
min Minimum pump speed
max Maximum pump speed
Off The pump is off
U Output signal (V)

Output signal (V)	Description
<1	Pump off
1-2	Hysteresis
2-3	Pump on (Minimum pump speed)
3-10	Pump modulates (Linear)

Control of 0-10 V Grundfoss system pump



R Pump regime
min Minimum pump speed
max Maximum pump speed
Sp Norminal set-point
U Output signal (V)

Output signal (V)	Description
<0.5	Pump on (Minimum pump speed)
>0.5	Pump modulates (Linear)

Control of PWM system pump

In this case, the 0-10 V signal controls the system pump 1:1.

Message about the supplied temperature

Output signal (V)	Temp °C	Description
0.5	-	Blockage
1-10	10-100	Delivered temperature

Message about the supplied heat output

Input signal (V)	Heat Output °C	Description
0	0	Boiler off
0.5	-	Blockage
2.0-10[1]	20 - 100	Heat output supplied

[1] Dependent on the minimum modulation depth (set speeds, standard 20%)

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ELECTRICAL CONNECTIONS AND CONTROLS REMEHA GAS 310/610 ECO PRO

GENERAL SPECIFICATIONS

NOTE: General specifications apply to each boiler module on the Remeha Gas 610 ECO PRO.

The Remeha Gas 310/610 ECO PRO boilers are supplied as standard with electronic operating and flame ionisation safety controls with a specially designed microprocessor at the heart of the system.

The boilers are pre-wired. All external connections can be made on the terminal strips.

Power supply

The boilers are suitable for a 230V-50Hz supply with phase/neutral/earth. Other connection values are only acceptable if an isolating transformer is installed. The boilers are sensitive to phase/neutral and therefore have a facility to ensure that phase and neutral are correctly connected.

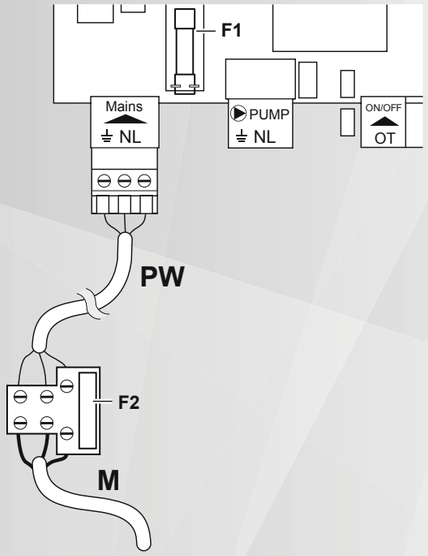
Automatic controls

COMFORT MASTER

The Remeha Gas 310/610 ECO PRO has a unique boiler code. This together with other data (incl. boiler type, counter readings, etc.) are stored in a code-key that belongs to the boiler. If the control unit is replaced, the counter readings remain stored in the code-key.

The main characteristics of the control unit are described in the table below.

Power supply voltage	230 VAC/50Hz
Rating of the main fuse F2 (230 VAC)	10 AT
Fuse rating F1 (230 VAC)	2 AT
Maximum power consumption of the pump	300 VA



REMEHA GAS 310/610 ECO PRO
OVERVIEW

The fan has Power Factor Control (PFC ensures that the mains supply is distributed more uniformly) and is fused with a 6.3 AT fuse Fb (next to the 230V terminal strip).

Temperature control

The boiler is equipped with electronic temperature control based on flow, return, and boiler block temperature sensors. The flow temperature can be set between 20°C and 90°C. The boiler reduces its power when the set outlet-temperature is attained. The cut out temperature is the set heating outlet-temperature + 5 °C.

Low water level protection (flow and content)

The boiler is fitted with a safety device to prevent the shortage of water based on temperature measurements (temperature difference between flow and return).

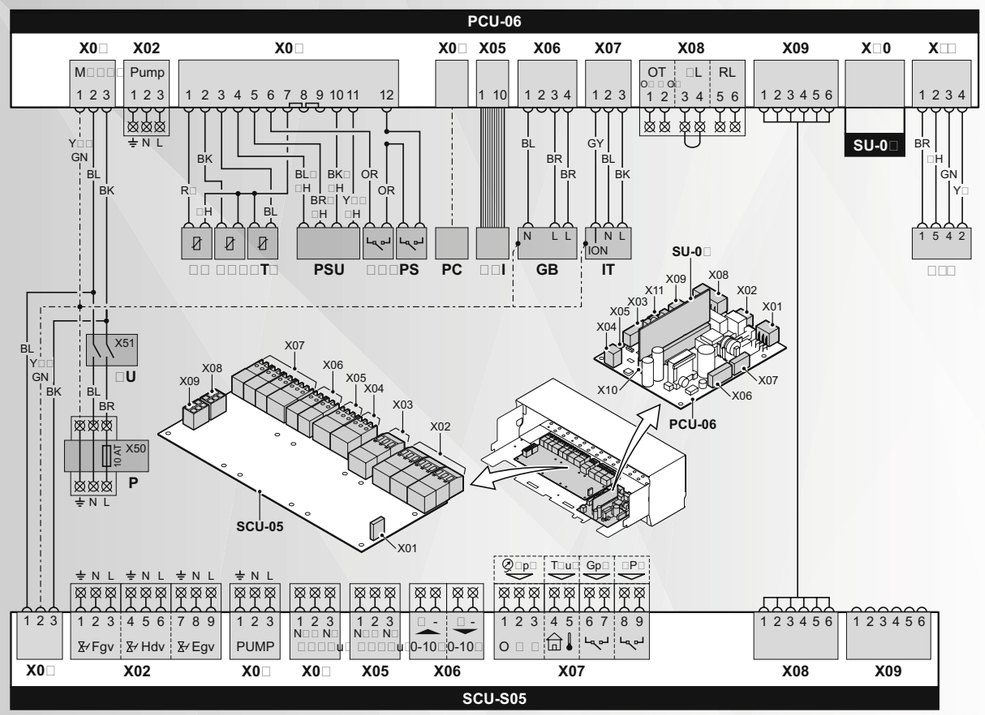
If ΔT = 25 K is reached (factory setting), the boiler reduces its output by modulating to remain in operation as long as possible.

If ΔT ⩾ 25 K the boiler goes into part load.

If ΔT >25 + 5 K the boiler goes into a normal control stop (temporary shutdown).

High limit protection

The maximum protection switches the boiler off if the water temperature is too high (110°C) and locks it on the control box (the minimum off time is preset to a fixed value (*1 seconds)). Once the fault has been rectified, the boiler can be reset by pressing the reset button for 2 seconds.



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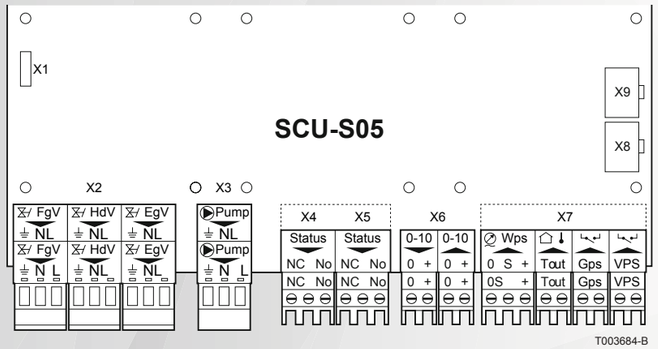
SCU-S05	Extended control PCB	**RTs**	Return sensor
PCU-06	Standard control PCB	**PSU**	Storage parameter
SU-01	Safety PCB	**HLs**	Safety thermostat
AU	On/Off switch	**PS**	Air differential pressure switch
P	Power supply	**PC**	Connecting a computer
N	Neutral	**HMI**	Control panel
L	Phase GB Gas block	**GB**	Gas block
FS	Flow switch	**IT**	Ignition transformer
HEs	Heat exchanger sensor	**FAN**	Fan



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SAFETY INTERLOCKS

This applies to Remeha Gas 310 ECO PRO and each module on the Remeha Gas 610 ECO PRO

As standard the boilers are supplied with two interlocks.

SHUTDOWN INTERLOCK

1. As standard the boilers are supplied with a shut down interlock carrying a 24 Volt AC boiler control circuit. This input does not require manual reset.

   Any external devices required to stop the boiler (e.g. limit switches of throttling valves, minimum gas pressure switches) should be wired in series and connected to terminals BL. Breaking the circuit will activate the safety interlock and put the boiler into a shut off condition.

RELEASE INPUT

2. As standard the boilers are supplied with a lock out interlock carrying a 24 Volt AC boiler control circuit. This input requires manual reset if activated.

   Any external devices required to stop the boiler (e.g. maximum gas pressure switch) must be volt free and should be wired in series and connected to terminals RL. Breaking the circuit will activate the safety interlock.

Hydraulic pressure sensor (Wps)

The hydraulic pressure sensor registers the water pressure and can shut the boiler down when the minimum water pressure is reached.

To activate this blocking option, a minimum pressure must be set with parameter P28 (Factory setting 0 = off). Connect the hydraulic pressure sensor to the Wps terminals of the terminal strip.

0 = Earth or neutral of the power supply
S = Signal or output from the sensor
+ = Supply voltage

Operation signal

As standard the boilers are supplied with internal relays to indicate boiler run.

Contact load:
- Maximum voltage: 230 volts
- Maximum current: 1 Amp

Common alarm (lockout)

As standard the boilers are supplied with an internal change over relay to indicate common alarm. The relay contacts are volt free and can be connected to confirm operation with closed or open contacts.

Contact load:
- Maximum voltage: 230 volts
- Maximum current: 1 Amp

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External gas valve control

If there is a heat demand, an alternating voltage of 230 VAC, 1 A (maximum) becomes available on the EgV terminals of the connector to control an external gas valve. Additional external interlocks (by others) may be required in a multi boiler installation.

IMPORTANT!

This supply cannot be used to control an external gas valve if it supplies other appliances.

Contact load:
- External gas valve voltage: 230 Volts
- Maximum current: 1 Amp

Optional accessories

Hydraulic pressure sensor
Gas leak switch (VPS)
Minimum gas pressure switch
Air Filter
Second Return
Recom Kit
Cleaning Tool
Combined Roof Flue Kit
Water Pressure Sensor
Adaptor for flue 250mm/200

Boiler pump control

The Remeha Gas 310/610 ECO PRO boilers have terminals which can be used to connect an external boiler pump. This pump is run once every 24 hours to prevent sticking (24 hour pump operation).

Two options are available

1. Shunt pump connect to pump terminals on PCU - 06 max 300VA
2. System pump connect to terminal on PCU - S05 plug x 03 max 300VA

Installation shutdown

If the central heating system is not used for a long period, we recommend switching the boiler off.

- Switch the On/Off switch to Off
- Switch off the boiler electrical power supply
- Shut off the gas supply
- Ensure that the boiler and system are protected against frost damage

CAUTION

In the event of low temperatures, we recommend that the installation continues to operate at a lower temperature. This prevents freezing.

REMEHA GAS 310/610 ECO PRO
OVERVIEW

Frost protection

CAUTION

Drain the boiler and central heating system if you are not going to use your home or the building for a long time and there is a chance of frost.

Set the temperature control low, for example at 10°C.

If there is no demand for heat, the boiler will only switch on in order to prevent frost damage.

When the heating water temperature in the boiler falls by too much, the integrated protection system in the boiler starts up. This protection functions as follows:

- The circulation pump switches on if the water temperature is lower than 7°C (if pump is electrically connected to boiler)
- If the water temperature is lower than 4°C, the boiler starts up
- If the water temperature is higher than 10°C, the boiler shuts down and the heating pump continues to run for a short time

CAUTION

The integrated protection system only protects the boiler, not the installation.

BlueEfficiency
CLEANER / GREENER / SMARTER

TreadLightly
ON THE PLANET

PREMIX BURNER
CLEAN COMBUSTION

ULTRA LOW NOx
BREEAM EXCELLENT

RECYCLABLE
MATERIALS

FULLY MODULATING
BOILER CONTROL

HIGH EFFICIENCY
106.4% NCV AT 50/30°C

SUPER CONDENSING
107% NCV = 82/71°C

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